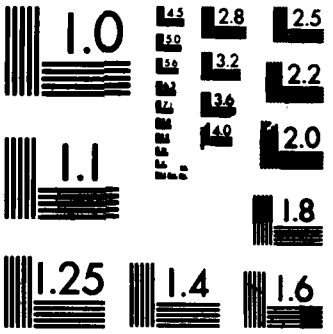
AD-A182 904 HIGH TEMPERATURE MATERIALS PROCESSING SCIENCE(U) 1/1
CORNELL UNIV ITHACA NY DEPT OF MATERIALS SCIENCE AND
ENGINEERING R RAJ 26 JUN 87 AFOSR-TR-87-0914
UNCLASSIFIED AFOSR-85-0062 F/G 13/9 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

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SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

AD-A182 904

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1a. REPORT SECURITY CLASSIFICATION: Unclassified	1b.
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION / AVAILABILITY OF REPORT: Unlimited
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE	
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6c. ADDRESS (City, State, and ZIP Code): Ithaca, New York 14853	7b. ADDRESS (City, State, and ZIP Code): AFOSR 410 Bolling Air Force Base, Solid State Div. Washington, DC 22209
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12. PERSONAL AUTHOR(S)

Raj, Rishi

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FIELD	GROUP	SUB-GROUP	

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

The equipment authorized under ~~this~~ Equipment Grant has been purchased by Cornell University. The equipment consists of (a) Differential Thermal Analyzer and (b) Hot-Isostatic-Press. Equipment (a) has been installed and is being actively used. Equipment (b) is in the process of being installed.

20. DISTRIBUTION / AVAILABILITY OF ABSTRACT	21. ABSTRACT SECURITY CLASSIFICATION
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22a. NAME OF RESPONSIBLE INDIVIDUAL: Dr Rosenstein	22b. TELEPHONE (Include Area Code): 202-767-4931; 22c. OFFICE SYMBOL: NE

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Cornell University

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June 29, 1987

Dr. A. H. Rosenstein
Director, Electronic and Solid State Sciences
Air Force Office of Scientific Research
Bolling Air Force Base
Building 410
Washington, D.C. 20332

RE: Final Report for the Equipment Grant AFOSR-85-0062
entitled "High Temperature Materials Processing Science"

Dear Dr. Rosenstein:

The above Grant provided for the acquisition for two pieces of equipment: (a) Differential Thermal Analyzer with temperature capability up to 1600°c, and (b) Hot-Isostatic-Press with a hot zone size of 4" dia x 5" high and with a pressure and temperature capability of 30,000 psi and 2000°C. Both pieces of equipment have been purchased by Cornell University. Quotations for the equipment were obtained from Theta Industries Inc., Netzsch Incorporated, ASEA Pressure Systems Incorporated, and Autoclave Engineers, Inc. The DTA/TGA system was purchased from Netzsch and the HIP from Autoclave Engineers. The specifications for both systems are described by the quotations which were used to fill the orders. Copies of these quotations are attached.

Both pieces of equipment have arrived at Cornell University. The DTA/TGA is already being extensively used in powder processing applications. The HIP is in the process of being installed. Our technician has received factory training for the operation of the equipment and space has been assigned for the installation of the equipment. Currently utilities are being brought to the HIP for power and water hook up. The equipment has made a significant difference in the facilities available for doing high temperature processing research at Cornell University.

We appreciate AFOSR sponsorship of this grant at Cornell University.

Yours sincerely,

Rishi Raj

RR/clr

QUOTATION

No. 50622/85

NETZSCH INCORPORATED
119 PICKERING WAY, PICKERING CREEK INDUSTRIAL PARK, EXTON, PA. 19341-1393 • (215) 363-8010 • TWX: 510-663-9340

May 23, 1985

Dr. R. Raj
Dept. of Materials Science & Engineering
Cornell University
Ithaca, NY 14853

Model STA 409/3/410 Thermal Analysis System

A. Measuring Part, composed of:

6.223.3-01	Balance with 20 g capacity; housing is vacuum-tight to 10^{-4} torr; inlet and outlet valves and all gas tubing is stainless steel for operating under corrosive or non-corrosive gas atmospheres
6.225.3-22	Single furnace hoisting device
6.225.3-03	Furnace - Temperature Range 25° to 1550° C. with regulating thermocouple, Type S, and vacuum-tight protective tube
6.225.3-56	STA Measuring Head, Type S thermocouple, with radiation shield Temperature Range 25° to 1600° C.
345 024	Water Circulatory System, thermostatically controlled

B. Control Cabinet

Temperature Controller and Amplifiers are housed in a standard 19" cabinet, 615 mm high

6.803.0	TG Amplifier with the following ranges: 0 - 12.5, - 25, - 50, - 125 mg/250 mm chart width with variable zero displacement, and ranges 0 - 250, - 500, and - 1000 mg/250 mm chart width with fixed zero

QUOTATION NO. 50622/85

B. Control Cabinet (cont.)

6.812.3	DTA Amplifier (with automatic zero suppression) Measuring Ranges: 0 - 25, - 50, - 100, - 200, - 500, - 1000, - 2000 µV/250 mm chart width
6.820.3	Temperature Amplifier with Type S thermocouple
1.101.1	Microprocessor Temperature Programmer 410
	Temperature Range -200 to +1800° C. Heating Rates 0.1 - 99.9 K/min in 0.1 K/min increments; Isothermal times from 0 - 99 h 59 min in 1 min intervals; Maximum of 20 program segments.
1.102.1	Supplied with Proportional-Integral Controller 410 with Type S thermocouple module
6.699.11	Silicon-controlled Rectifier and
348 178	Output Transformer
	Power Requirements: 220 V, 60 Cycles, single phase

PRICE for Complete System F.O.B. Destination $ 26,000.00

DELIVERY: 14 Weeks after receipt of purchase order

VALIDITY: June 30, 1985

NETZSCH INCORPORATED

John S. Kelly

John E. Kelly III
Manager

JEK:cq

Autoclave Engineers, Inc.
2930 West 22nd Street / P. O. Box 4007 / Erie, Pennsylvania 16512, USA
Telephone (814) 838-2071 / Telex 91-4430

July 5, 1985

Cornell University
120 Maple Avenue
Ithica, New York 14850

Attention: Mr. Dave Chatterton
Purchasing Department

Subject: Hot Isostatic Press
AE Proposal #M10-2513-86F

Gentlemen:

In response to your request for quotation, we are pleased to submit the following for your review and consideration.

Our proposal consists of four sections all of which form an integral part of this proposal.

1. Executive Summary & Pricing
2. Technical Specification
3. Spare Parts List
4. General Information

All of the terms and conditions set forth on attached Form GTCS-5177 (Rev. 12/82) apply to this proposal.

If you have further questions or if we can be of additional assistance, please contact me. Your reference to our proposal number in all correspondence concerning this inquiry will be appreciated.

Very truly yours,

Edward C. Barthelmes

Edward C. Barthelmes
Engineering Product Specialist
Engineered Product Operations

ECB/leb
Attachments

cc: Dr. Raj - Cornell University
F. X. Zimmerman, D. F. Heubel

Autoclave Engineers, Inc.
Erie, Pennsylvania

0756b
July 3, 1985

ITEM #1

EXECUTIVE SUMMARY & PRICING

Model: 30M 3.2-5.5 GU 200 Y-EHC-O

Pressure Vessel Rating:	30,000 PSI.
Closure:	Yoke
Temperature Rating Maximum:	2000° C.
Hot Zone Size:	4" Diameter x 5.5" Convection 3.2" Diameter x 5.5" Radiation
Compressor:	30,000 PSI. Discharge
Control System:	TCS/Distributed Control
Power Requirements:	480V @ 62 Amp.
Process Gas Consumption:	50 SCF @ 1500 PSI.
A.S.M.E. Code Stamp:	Included
Start-Up Spare Parts:	Included
(2) Cycle Testing at AE:	Included
Sinter/HIP Capability:	Included
Operation Manual:	Included
FIRM LIST PRICE:	$100,100.00

SHIPMENT: 18-20 weeks after receipt of an order.

F.O.B.: Erie, PA

Options

1. Check-Out & Start-Up at Site:	$ 680.00/Day + Expenses
2. Consumable Spare Parts (Mechanical & Electrical)	2,000.00
3. O_2 Monitor for Safety:	3,500.00
4. Turnkey Installation @ Site:	6,180.00
5. Heating Element - 2 Zones:	1,700.00

END

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